# Government-Led Programs to Improve Maternal and Infant Health in India: a Systematic Review of Literature

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## Abstract

India has unacceptably high maternal and neonatal mortality rates (174 per 100,000 and 28 per 1000, respectively) due to lack of antenatal care, unskilled delivery, and poor access to emergency obstetric services. To meet the United Nation's 2015 Millennium Development Goals, the government of India (GOI) implemented several programs to improve access to maternal healthcare services. The purpose of this systematic review is to synthesize and critically appraise the literature on government-led programs to improve maternal and infant health in India. Database searches were conducted in PubMed, Scopus, Medline, EBSCO, Cochrane Library, and CINAHL using key terms such as India, Indian women, Asian Indian, maternal care, antepartum care, postpartum care, skilled delivery attendance, rural healthcare access, and prenatal care. Articles published from January 1, 2002 to January 31, 2016 were included. Reviewers critically appraised the 32 qualifying articles using the Qualitative Assessment Review Instrument (QARI). Analysis of the literature identified one of the premier initiatives implemented in 2005 by the GOI, the Janani Suraksha Yojana (JSY) program. JSY uses conditional cash transfers for institutional delivery and employs Accredited Social Health Activists (ASHA) to promote maternal care in each India state. Studies show that programs have had minimal positive effect on maternal mortality rates (MMR), and the infrastructure of these healthcare systems is not ready to support a high level of quality of care. In conclusion, the GOI has made considerable effort to improve access to maternal care. Areas that need improvement include health promotion, infrastructure, and quality of care.

# Chapter I: Statement of the Problem

## Introduction

The maternal mortality rate (MMR) in India has fallen short of the targeted United Nation's (UN) Millennium Development Goals (MDGs). While some improvements have been documented, the question remains: what can be done in India to get them on course to be a leader among the rest of the developing world? The MDGs were established in 2000 with the overarching goal to reduce the under five mortality rate by two-thirds, and reduce MMRs by three-fourths between 1990 to 2015 (United Nations, 2016a). Neonatal mortality is a significant contributors to under-five mortality and will be the focus in this review. In 1990, the MMR in India was 556 per 100,000 live births (WHO, 2016), and the neonatal mortality rate was 55 per 1,000 live births (World Bank, 2016a). In 2015, India still had unacceptably high maternal (174 per 100,000) and neonatal mortality rates (28 per 1,000) (World Bank, 2016a). High rates of maternal and neonatal mortality can be attributed to a lack of antenatal care, unskilled delivery, and poor access to basic emergency obstetric and newborn care (Islam, 2011). To meet the UN's 2015 MDGs, the government of India (GOI) implemented several programs to improve access to maternal healthcare services. In spite of these efforts, India still accounts for 15% of the global burden of maternal deaths (Dey, 2016).

The purpose of this systematic review is to synthesize and critically appraise the literature on India's government-led programs that have been created to improve maternal and infant health. By illustrating the findings of the reviewed literature on the impact of these programs, this paper may help focus future research along a more effective path toward discovering better healthcare strategies and, ultimately, influence future government policy toward improving the implementation of improved healthcare programs and subsequent access to maternal and neonatal healthcare.

## Chapter II: Literature Review

Maternal mortality and the under-five mortality rates (of which infant and neonatal rates are significant contributors and are interrelated with maternal deaths) are important indicators of public health and have been the focus of global efforts of closing the healthcare disparities between developed and developing nations. As mentioned before, the United Nations in 2001 called attention to the alarmingly high maternal mortality and under five mortality rates. South Asia is a significant contributor to the overall global burden of these rates. The South Asia Region, to which India belongs, contributes 32% of the global burden with approximately 500 million maternal deaths per year (Islam, 2011).

Adverse maternal and neonatal mortality in India can be attributed to anemia, eclampsia, hemorrhage, hypertensive disorders, sepsis, and prolonged or obstructive labor. Islam (2011) points out these causes can be successfully managed with hospital care and adequate prenatal care. Because these complications to healthy delivery are treatable, and in many cases preventable, the focus of the Indian government has been to reduce access barriers to prenatal care, skilled-delivery attendance, and postpartum care. The challenge lies in the variety of access barriers that exist in India. Dalal and Dawad (2009) found that many women did not use public health facilities because there were no facilities near them, or they were unaware of public facilities near them. The Dala and Dawad (2009) study also found that women with less education were less likely to utilize services.

While it may be argued that a government cannot be responsible for the scope of issues related to their population's access to healthcare, a study by Chatterjee and Paily (2011) clearly shows the contrary point. Chatterjee et al. (2011) shows that government can, in fact, be the cause of major barriers to healthcare access if one considers infrastructure problems due to lack

of government funding, a shortage of qualified healthcare staff due to poor government policy, and a failure to have access to state of the art equipment due to poor economic and commercial stimulus. The portion of India's population that lack monetary funds are reluctant to spend money on public healthcare services because of the reputation for poor quality of service. Even if the healthcare service provided is good quality, an individual may not be able to visit a healthcare facility simply because it is too far from their home and they lack any means of transportation to these facilities. In addition, there are other social determinants affecting an individual's decision to go to a healthcare facility, which includes: 1) low literacy, 2) the lack of female autonomy, 3) the young age (and therefore inexperienced) of child-bearing couples, and 4) the lack of knowledge of good health practices. Each of these factors can contribute to a lack of good judgment in healthcare seeking behavior. As Chatterjee and Paily (2011) point out, for years the Indian government sponsored the use of Traditional Birth Attendants (TBA). In the past, the government created a culture through training TBAs, in which generations of mothers developed a dependence on these under qualified attendants. As a result of this policy, India now faces a nation without enough doctors and qualified midwives in the area of maternal healthcare. The doctor to people ratio in India in 2011 was 0.7 (World Bank, 2016b).

This study will illustrate the current initiatives by the government of India, which aims to reduce barriers to maternal healthcare access and improve maternal and neonatal health outcomes. The reduction of maternal and neonatal mortality in India is an important goal because India is perceived as a leader of healthcare in the developing world. The success of these types of programs goes beyond the borders of India and sets an example for how other developing nations may tackle these types of health challenges on their own.

# Chapter III: Methods

## Inclusion and Exclusion Criteria

The structural basis of this review is outlined in the Preferred Reporting Instrument for Systematic Reviews or Meta-Analyses (PRISMA) format (PRISMA, 2015). Database searches were conducted using PubMed, Scopus, Medline, EBSCO, Cochrane Library, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The key search terms were *India, Indian women, Asian Indian, maternal care, antepartum care, postpartum care, skilled delivery attendance, rural healthcare access,* and *prenatal care*. Only articles published between January 1, 2002 to January 31, 2016 were included in the literature search. Publications included were restricted to the English language and accessible by an online database search. Additionally, articles were included with a focus on mothers and infants. Although publications that solely discussed the topics of abortion and contraception are acknowledged to be significant issues for women and maternal health, they were not included in this review. Similarly, publications focused on India's health programs emphasizing childhood immunizations were not included.

## Study Selection and Data Abstraction

Studies were first eliminated according to the relevance of the title. Articles with relevant titles were then reviewed by two individuals (first author and second author) and those abstracts that did not fit the inclusion criteria were eliminated. Finally, full-text articles were read by the first author and eliminated if the article was not applicable to this systematic review. The second author reviewed 10% of the articles. Some examples of studies that did not qualify were those that did not meet the aforementioned inclusion criteria or, if upon closer study, were found to be outside of the scope of this study. Articles considered outside of the scope of this study were: in

a digest format, commentary pieces (with no data), or included a very broad statistical analysis at the population level and did not have a focus specifically on maternal or neonatal health. Authors' differences in opinion were then discussed and a consensus was reached as to inclusion decisions. This process was repeated in steps of elimination according to title and abstract. Finally, full-text articles were read and evaluated for inclusion and simultaneously data were extracted. The second author read 10% of the full text articles. Those not included were those that were found during close examination of the full-text to not meet the inclusion criteria or fell outside of the scope of the paper.

Data were extracted from each article of vital information and arranged in a table. Examples of the data extraction included description of the sample, description of intervention/program type, targeted outcome, and results. To reduce reviewer bias and to maximize consistency, there were two reviewers that evaluated the same articles and compared results. Differences were then discussed, and a consensus was reached to ensure that the inclusion criteria were appropriately applied to qualifying articles.

**Critical Appraisal Methods**

For the final step, the publications included in the final literature review were critically appraised by the authors using the Qualitative Assessment Review Instrument (QARI) tool (Godfrey & Harrison, 2015). The QARI is a tool that assesses the quality of included articles. This tool evaluates each of the articles using 10 questions that examine consistency in methodology, logical flow of data through interpretation, ethical considerations, and adequacy of the variety of perspectives being represented in the target population/participants. Examples of questions asked in this tool are presented in *Table 2*, providing details on the QARI assessment

tool results. First and second authors then answered each of these questions as yes, no, unclear, or not applicable. Differences in opinions were discussed by both reviewers until a consensus was reached.

# Chapter IV: Results

## Study Characteristics

The number of articles found in the literature search is presented using the PRISMA flow diagram in *Figure 1*. Figure 1 illustrates that in the initial search of the literature, 1,248 articles were identified after eliminating duplicates. The authors then screened the remaining articles according to title and then abstract. Following this step, the remaining 59 full-text articles were read and 32 were found to satisfy our inclusion criteria.

The publications included in this review utilized a myriad of different study designs. Of the qualifying articles (n=32), study designs included an analysis of survey data (n=5), quasi-experimental design (n=1), secondary data analysis (n=6), formative evaluation (n=4), qualitative study (n=4), mixed methods (n=2), cross sectional study (n=8), and retrospective analysis (n=2).

## Janani Suraksha Yojana

Of the 32 publications evaluated, nearly all of the articles referenced the National Rural Health Mission (NRHM) (Amudhan, Mani, Rai, Pandav, and Krishnan, 2013; Carvalho, Thacker, Gupta, & Salomon, 2014; Coffey, 2014; Doke, Gawande, Deshpande, & Gadgil, 2014; Evans, Maine, McCloskey, Feeley, & Sanghvi 2009; Fathima, 2015; Fotso, Higgins-Steele, & Mohanty, 2015; Gita, Bharti, Shashi, & Arvind, 2012; Gopalan & Durairaj, 2012; Gupta et al., 2012; Kori, Bhatia, & Mishra, 2015; Kumar, Mishra, Kaushal, Gupta, & Khan 2015; Kumutha, Chitra, & Vidyasagar, 2014; Lim, 2010; Modi et al., 2015; Ng et al., 2014; Pardeshi, Dalvi, Pergulwar, Gite, & Wanje, 2011; Powell-Jackson, Mazumdar, & Mills, 2015; Prasad, Chakraborty, Yadav, & Bhati,, 2013; Randive, Sebastian, Costa, & Lindholm, 2014; Sidney, Diwan, El-Khatib & Costa , 2012; Singh, 2012; Varghese, Roy, Saha, & Roalkvam, 2014; Vikram, Sharma, & Kannan, 2013) and specifically it's initiative Janani Suraksha Yojana (JSY),

also referred to as the JSY "scheme" (Amudhan et al., 2013; Carvalho et al., 2014; Coffey, 2014; Doke et al, 2014; Fathima 2015; Fotso et al., 2015; Gita et al., 2012; Gopalan & Durairaj, 2012; Gupta et al., 2012; Kori et al., 2015; Kumar et al., 2015; Kumutha et al., 2014; Lim, 2010; Modi et al., 2015; Ng et al., 2014; Powell-Jackson et al., 2015; Prasad et al., 2013; Randive et al., 2014; Sidney et al., 2012; Vikram et al., 2013; Zavier, 2013). The English language translation of "Janani Suraksha Yojana" is "Maternal Protection Scheme." The NRHM created JSY in 2005 with the objective of reducing maternal and neonatal mortality. The program employs the use of conditional cash transfers as an incentive to providers and mothers throughout the country to have institutional deliveries. Institutional delivery entails giving birth in a skilled medical facility. The NRHM and JSY promote the use of government hospitals and the use of public-private partnerships. A special emphasis has been placed on states that have a lower rate of institutional delivery in the earliest training of Accredited Social Health Activists and higher rates of reimbursement with in those states. This has resulted in a different scale in reimbursement between high preforming states (HPS) and low preforming states (LPS). LPS are states which had a lower than 25% rate of institutional delivery. Mothers living in LPS will receive more compensation than mothers residing in HPS. For example, a mother residing in a LPS will receive 1000 Rs (rupees; approximately 15.38 USD), while a mother in an HPS will receive 600 Rs (approximately 9.28 USD) for having an institutional delivery *(Figure 2).*

**Accredited Social Health Activists**

Another critical component of the JSY is the implementation of Accredited Social Health Activists (ASHA) for institutional delivery (NHM, 2013; ASHA, 2014). ASHA workers are the point of contact for expectant mothers who will receive government maternal services. They are

trained volunteers who receive a share of the JSY conditional payments, and are responsible for promoting maternal care in each state in India. The AHSA register pregnancies with the government, promote prenatal care, escort mothers to hospital for skilled delivery attendance, and promote postpartum care. Another aspect of the ASHA workers is to act as health educators providing guidance on the available government resources such as family planning and child immunizations (ASHA, 2014). Unfortunately in the literature examined, there are concerns regarding consistency of quality of training, oversight, and accountability for ASHA worker performance. While in some areas of the country (particularly southern states such as Tamil Nadu), great improvements have been observed under the NRHM with ASHA programs. Other areas of India have not seen such improvement. Doke et al. (2012) observed only 10% of women received informational support from ASHA workers in Maharashtra. This indicates a failure of expected ASHA responsibilities, which could be due to ineffective training, low oversight, or understaffing in needed areas, particularly in tribal areas (Doke et al., 2012). Similarly, Kori and colleagues (2015) assessed ASHA worker knowledge of several points including roles and responsibility, prenatal care, intranatal care, postpartum care, newborn care, immunizations, available government resources, and family planning. They found that ASHA's knowledge to be highly variable with little oversight. Since these ASHA workers are often the most frequent point of contact for women and have a perceived position of authority, it is essential for there to be consistent standardized training, especially in the area of recognizing the warning signs of emergency situations. Modi et al. (2015) found that this lack of government oversight and support of ASHA workers led to many mothers not receiving needed health support coverage and subsequently experienced greater complications during pregnancy. Using additional technology may be an aid to providing improved care. Sidney et al. (2012) confirms in her study

in the Ujjain District of Madhya Pradesh, that the quality of an ASHA's performance with mothers who benefited from JSY was highly variable and many times women are not receiving the level of care they should expect.

**JSY Effect on Institutional Delivery and Mortality**

Since 2005, the year JSY was first implemented, India has seen a decrease in maternal and neonatal deaths. According the World Health Organization (WHO) (2016), maternal mortality has decreased from 280 deaths per 100,000 in 2005, to 174 per 100,000 in 2015. Similarly, the World Bank (2016a) reports that neonatal deaths have decreased from 38 per 1,000 in 2005 to 28 per 1,000 in 2015.

The aforementioned JSY program puts an emphasis on institutional deliveries as an effort to improve mother and infant outcomes. In a 2012 observational study, Gupta, et al., found a hospital in Madhya Pradesh had a 43% increase in institutional deliveries in the two years following the implementation of JSY. Unfortunately, the study also noted an increase in maternal deaths (total 137) during the second phase of study period (after implementation of JSY) compared to 78 deaths reported during the 2 years prior to the implementation of JSY. Ng and colleagues' (2014) study, which assessed the impact of the JSY CCT program on maternal mortality reduction in Madhya Pradesh, found no significant decrease to the MMR in that state. Although Ng et al. (2014) similarly found that there was a significant increase in institutional delivery in the state since the initiation of the program (32% increase in institutional deliveries in general), the MMR did not appear to be directly affected by JSY.

## Disparity in Access and Benefits

In separate studies looking at who benefits from the NHRM and JSY, Kumar et al. (2015) and Prasad et al. (2013) both identified a disparity between those that live in poverty and those that do not. Kumar and colleagues' (2015) study in the Indian state of Uttar Pradesh found that the study group with the most increase in use and benefits of the government hospital services since the implementation of JSY have been mothers that come from "socially backward groups" (a term used by the government of India to describe castes and tribes that are educationally and socially disadvantaged) and "socioeconomically deprived classes." These groups saw the most increase in institutional delivery, prenatal registration, and postpartum follow-up care. Similarly, Prasad et al. (2013) observed that the flexibility the NRHM gives to states to focus on areas that are in need of the most improvement has resulted in a reduction in rural and urban disparity with institutional delivery. Prasad et al. (2013) notes that in 2004, infant mortality (in which neonatal mortality is a significant contributor) was 24 points higher in rural areas than in urban areas. After the NHRM implementation, high focus states have experienced a 15.6 point decline in rural infant mortality rates (in which neonatal mortality is a significant contributor), whereas there was only an eight point decline in the urban areas (Prasad et al., 2013). From this perspective, the NHRM is a great benefit to rural mothers and their infants.

## Prenatal and Postpartum Care

While institutional delivery is seemingly the primary focus of the Indian government's measure of improvement in maternal care and neonatal outcomes, antenatal and postpartum care are also essential to improving outcomes. The later services are promoted in local areas by ASHA workers. Doke et al. (2014) found that the mothers who were the least likely to attend the

minimum of three appointments were also those who were the least likely to receive JSY benefits. Vikram et al. (2013) found that 92% of women who received three or more antenatal visits were beneficiaries of the JSY program. In contrast, Powell-Jackson et al. (2015) found that use of JSY was not significantly associated with the increase in antenatal appointments. However, increased antenatal care and faster referrals to higher level hospitals may result in lower incidence of maternal and neonatal deaths (Gita et al., 2012). It is important to note that caste status and Hindu religion were strong predictors of antenatal care attendance (Rani et al., 2008; Vikram et al., 2013). The consideration of caste and religious status are other barriers to antenatal care, which should be studied further.

The postnatal period lacks support in healthcare as well. Carvalho and colleagues (2014) illustrate that while there was an increase in postpartum appointment attendance and early breastfeeding initiation, there was an extreme lack of quality postpartum care. The authors also suggests the program did not increase the care seeking behaviors of mothers for their children and infants. This could mean that in order to improve outcomes for infants, the JSY could make improvements in the area of health education.

**Conditional Cash Transfers**

A significant foundation of the JSY program is the conditional cash transfer (CCT) to mothers utilizing institutional delivery. Under the NRHM and JSY, mothers receive a preset benefit of either a 1000 Rs delivering in a healthcare institution in an LPS or 600 Rs for delivering in an HPS (*see Figure 2*). The ASHA workers that escort the mothers to hospital for delivery also gets paid a premium (amount varies). In an LPS, ASHAs are compensated 200 Rs for escorting a mother to a hospital for an institutional delivery, whereas in an HPS they do not

receive this CCT. In some areas where private providers are contracted to provide obstetric care, they too are guaranteed a fixed amount of pay. Amudhan (2013), in research conducted in the Indian state of Haryana, found that CCT does not have the expected impact among disadvantaged mothers. Similarly, Coffey (2014) found that outcomes for mothers and infants did not improve because, "service providers are focused on capturing the economic rents from JSY, and provide an extremely poor quality of care" (p.92). In some instances, it has been found the CCT has not been an incentive to its target population of the extremely poor, but instead, benefits the upper lower class (Randive et al., 2014). Doke and colleagues (2014) observed that there is a lack of understanding of CCT and JSY benefits. They found that women are not even sure they have received their benefits. There have also been reports of untimely distribution of funds.

It appears that the conditional transfer of funds after institutional delivery, while motivating, may not be enough. In rural regions, the cost of transportation to a government hospital may be prohibitive to the poor, not to mention government supported transportation may be slow or unreliable (Gupta et al., 2012). Doke et al. (2012) also point out that the eligibility requirements to qualify for JSY and CCT in the state of Maharashtra is leaving many women without access to institutional delivery. Doke et al. found that only 41% qualified for benefits of JSY, and of these, only 52% received the CCT. In order to obtain benefits in the state of Maharashtra, women must provide a certificate indicating that they live below the poverty line (less than 122 Rs a day) along with a scheduled caste certificate. The literacy of the mother's family (medical decisions are often made by the husband and other senior members of the family), and the loss of income due to work time lost may be prohibitive to obtaining these documents, and therefore, are barriers to obtaining eligibility for CCT (Doke et al., 2012).

Gopalan and Durairaj (2012) suggest that further research is warranted to explore the providers' role and perceptions of such programs.

**Effects of Quality and Availability of Emergency Obstetric Care**

While there has been a sharp increase in the incidence of institutional delivery, the evidence shows minimal correlation between institutional delivery and the decrease in MMR and neonatal mortality. Several studies argue that this could be due to poor infrastructure including lack of emergency obstetric care (EmOC), quality facilities, and quality staff (Singh, 2011; Gita et al., 2012; Randive et al., 2014; Evans et al., 2009; Rani et al., 2008). Singh et al. (2011), like most of the other studies examined in this review found that quality was lacking. Across many of the aforementioned studies the findings indicate that an increase in institutional delivery does not improve perinatal mortality rates. This can be attributed this difference to a shortage of qualified human resources and a lack of overall quality facilities, training and care (Gita, et al., 2012; Singh et al., 2011). This sentiment is held by several other researchers (Randive et al., 2014; Evans et al., 2009). Rani et al. (2008) found that there was low quality of antenatal care in northern and southern states of India, with southern states preforming slightly better than the northern states. The north and south quality disparity can be seen through Rani's examination of receipt of specific facets of maternal care. For example, Rani et al. (2008) observed that only 38% of women in the south received a urine test during pregnancy compared to 80% in the south. Similarly, other procedures such as blood examination, weights at visits, blood pressure monitoring, and abdominal examination show a north/ south difference. The disparity of care based on low socioeconomic class was also observed. Although JSY is meant to improve access to care for all, with focus on bringing down the economic barrier through its CCT, it is observed

that the richest districts have benefited from the program with a 40% to 69% increase in institutional delivery; whereas poorer districts have experienced an increase from 16% to 45% (Randive et al., 2014). Rani and colleagues (2008) caution readers that if there is a low quality of care, particularly during the antenatal period, there will be a lower incidence of utilization of services. Biswas et al. (2002) studied a 2-day training program for health workers in various areas across India and found that these workers were in much need of training. Knowledge of maternal and infant care greatly improved among participants after the training. Participants were evaluated on basic knowledge of government health services and programs pre and post-training. Participants showed a significant increase in knowledge post-training. For example, three workshops in the city of Kolkata were and evaluated by Biwas et al. (2002). It was found that the mean score of the pre-training assessment, of basic knowledge of government health services and situations to increase acuity of care ,increased from 18.2, 18.4, 16.4 to 29, 28.3, 24.3, respectively, in the post-training assessment $p < 0.05$. These findings suggest a need for training healthcare workers in rural areas. To complicate the issue even further, Coffey (2014) notes that smaller hospitals struggle with high rates of health worker absence and some hospitals may not be open 24 hours a day.

Randive and colleagues (2014) examined EmOC through analyzing the cesarean rate in nine states in India. Cesarean sections are considered an intervention to be taken in the case of emergencies, not for convenience sake (WHO, 2015); therefore, the data may be appropriate to measure the availability of EmOC (Randive et al., 2014). Evans et al. (2009) found that the Indian government is trying to meet the need for additional qualified obstetricians to provide EmOC. Evans and fellow researchers found that training in India needs to be improved and for ultimate effectiveness of EmOC, JSY needs to be evaluated for effectiveness. Furthermore, the

training of other healthcare providers, such as anesthesiologists, must occur in order to provide the highest quality care.

**Other Initiatives**

In spite of the great strides made by the NRHM and ASHA workers, some barriers to healthcare access still exist. One barrier to access is female autonomy. Women in developing nations are often reliant on their husbands to make medical decisions for them including decisions to access care. In recognizing the success made by ASHA workers, Fotso et al. (2015) conducted a study incorporating male health activists who accompany female ASHA workers, and help to provide husbands with information regarding reproductive health and services. The study took place in the state of Odisha. Families that were to receive the counsel of the male health activists had their names randomly chosen from records of four facilities resulting in the small sample of eight families. Although the sample is very small, the authors note success in the programs since these male workers were able to do work that women ASHA workers could not do, such as travel alone at night, provide informational support to the husbands, and coordinate transportation. Having this kind of support allowed the ASHA to remain focused on the mother and the impending delivery (Fotso et al., 2015).

**Yashoda**

A unique program is the Yashoda program. The Yashoda program, as described by Varghese et al., in their 2014 publication, is a partnership between the NRHM and the Norwegian government. The program was initially piloted in the states of Rajasthan and Odesha. In response to the fact that public health institutions struggled with quality in the wake of the

great increase in institutional delivery, the partnership developed a postpartum role to non-clinically support the new mother in facilities. According to Varghese et al. (2014), the Yashoda role includes breastfeeding support and education, newborn care and information about immunizations, and education regarding family planning, feeding, and hygiene. In contrast to control facilities that did not implement the Yashoda program, the researchers of the study found that mothers were more likely to initiate breastfeeding within five hours (especially those who had cesarean sections), mothers and families felt more comfortable, and mothers were more likely to receive exams in facilities in which the Yashoda role was implemented. The authors also note the poor level of postpartum care quality across all facilities in the study. Partnerships such as these with NRHM could do much to support mothers and their infants.

Another government program titled, the National Urban Health Mission (NUHM), was established in 2008. The goal of the NUHM is similar to the NRHM, which is to increase institutional delivery in order to decrease maternal mortality and neonatal mortality. However, the focus of the NUHM is in urban areas as opposed to the rural areas. In the research of Singh, Rai, and Singh (2012) which did not specifically examine JSY, it was observed many of the poorest groups, including a migrant class, often “fall between the cracks” and lack access to benefits and care. While the data examined in this study falls before the implementation of the NUHM, Singh et al. (2012) specifies a requirement that the NUHM provides targeted promotion to these populations in the mega-cities throughout India.

As seen in these results, common themes and findings found in the literature include increased institutional delivery, inconsistent access, quality differences, lack of EmOC, and delayed cash incentive payment. Incidentally, maternal and neonatal mortality rates have not decreased substantially as a result of India’s programs.

## Critical Appraisal

Lastly, the publications were critically appraised using the Qualitative Assessment Review Instrument (QARI) tool (Godfrey & Harrison, 2015). Results of the critical appraisal found that the quality of the individual articles is varied. As seen in *Table 2,* several articles lacked clear congruent flow between the stated philosophical perspective and the research methodology, lacked an ethical statement and did not have a statement that identified the author culturally (Amudhan et al., 2013; Carvalho et al., 2014; Chatterjee & Paily, 2011; Coffey, 2014; Evans et al., 2009; Fathima 2015; Gita et al., 2012; Gopalan & Durairaj, 2012; Jimenez et al., 2013; Kori et al., 2015; Kumar et al., 2015; Kumutha et al., 2014; Lim, 2010; Pardeshi et al., 2011; Singh et al., 2015; Singh et al. 2012; Singh et al., 2011; Prasad et al., 2013; Randive et al., 2014; Sidney et al., 2012; Vikram et al., 2013; Zavier, 2013). There were also articles in which it was unclear if the voices of the represented population were adequately presented. However, all of the articles showed congruity between the research methodology and the research question or objectives, methods to collect the data, analysis of the data, and interpretation of the results.

## Chapter V: Discussion and Conclusion

In this systematic review, we identified the programs the government of India has implemented to improve maternal and neonatal mortality in the country. Additionally, we examined the literature and assessed the qualifying articles for quality. It is easy to see that strides toward better outcomes for mothers and their infants have been made due to the efforts made by the Indian government. Better outcomes for mothers and their infants is not only beneficial to the said parties, but also benefits the larger community. When mothers and their children are healthy, families are able to remain stable or grow financially in that there are less lost work days for the mother and other members of the family. They also do not incur medical expenses.

Several states have implemented programs that work in conjunction with the national government. For example, the JSY partnership program in Tamil Nadu has frequently appeared in the literature as being a successful state program. National and state partnerships may be an opportunity for the GOI to have a national focus on reducing its maternal and neonatal mortality burden while the states are able to tailor such programs to be most effective for their population's circumstances. It is the opinion of this researcher that these types of programs warrants further research.

It is also evident that there is disparity in healthcare facility delivery uptake and access. This disparity has been correlated to economic status, caste, and religion. Further research into local factors that are causing the great disparities in the quality of care that is provided throughout the country of India is recommended. Additional research also must be conducted into the efficacy of conditional cash incentive programs in developing nations as a whole. The government can continue to breakdown the barriers of access by focusing holistically on the

barriers women face when trying to access care. Including finances, transportation, informational, and women's autonomy barriers.

Furthermore, the research indicates that GOI needs to improve quality and support to its point of contacts. This may need to be done through embracing new technologies such as that described by Modi et al.'s (2015) study in which he discusses the use of mobile technology to aid ASHA workers. Creative use of technologies and allocation of resources will be essential to meet current and future challenges for such programs as the NRHM.

In the course of this literature review, two systematic reviews were found that focused on examining CCT in several countries. Jehan et al. (2012) examined CCT and voucher schemes in four countries in South Asia (Nepal, India, Pakistan, Bangladesh). A common concern found is the delayed release of funds in all of these types of programs. The delay in release has caused reticence among private institutions to provide services to those who receive CCT benefits. Such public-private partnership is essential for coverage in rural areas where public hospitals are not available. The efficacy of these programs, both in India and in other developing nations, has been called into question (Jehan et al., 2012). Similarly, Murray et al.'s (2014) systematic review of countries that utilize demand-side financing including CCT, found that while such schemes initially increase maternal care coverage, quality is quickly sacrificed due to lack of infrastructure, qualified staff, and slow payout. These authors also state there is some evidence suggesting providers are keeping the mother's benefits and falsifying claims, which leads to an overall loss of trust in such programs. While these systematic reviews provide insight into CCT, this systematic review of the literature brings a more holistic perspective into the programs and initiatives that India has taken to improve health outcomes for mothers and their neonates.

While the aim of this systematic review was to be inclusive and representative of the available literature, the authors were limited by inclusion criteria, the English language, inclusion dates and incomplete data retrieval due to articles were only included if they were accessible through online databases. The authors tried to be comprehensive in our literature search, but may have missed articles or excluded inappropriately publication bias. Regardless of utilizing peer review to reduce bias and optimize accuracy, the risk of error and bias cannot be reduced entirely.

Additionally, the authors recognize that this systematic review is limited by the depth and quality of the included studies. As mentioned earlier, the quality of the articles was varied according to the critical appraisal results of the QARI tool. Some of the data in these studies was from population level district surveys. This type of secondary data analysis can be superficial and it is the suggestion of this author that more focused studies be conducted on the village (or community) level with special attention to quality.

This systematic review provides a holistic view of programs the government of India has implemented in order to improve outcomes for mothers and their neonates. To our knowledge, this is the first systematic review that provides such a complete picture of the evidence. In providing this review, it is the hope of the authors to illustrate that there are gaps in the research and to call for future research to be conducted into the quality of maternal care in India, enforcement of CCT, and the underlying causes of poor prenatal care. Additionally, more research into training inequalities may provide insight into differences in quality of both ASHA performance and medical staff throughout the country.

## Conclusion

In conclusion, it is easy to see that India has made enormous strides to attempt a reduction of maternal and neonatal mortalities through the use of:

1. focused national programs,
2. cash incentive schemes, and
3. locally focused ASHA workers.

Improvements are evident in the reduction of maternal and neonatal mortality rates since the initiation of the JSY program in 2005 and in 2015. As illustrated in 280 per 100,000 maternal mortality and 38 per 1000 neonatal mortality rates in 2005 compared to 174 per 100,000 maternal mortality and 28 per 1000, neonatal mortality rates in 2015 (WHO, 2016; World Bank, 2016a). However, there are still gaps in maternal care access. Much can be improved in the realm of EmOC, incentives for quality care under the JYS initiatives, and the effectiveness of ASHA workers in the community. In order to be an example for other developing nations, the government of India has a responsibility to reduce its maternal mortality and neonatal mortality rates, and must work harder to achieve, and potentially exceed, the current UN Millennium Development Goals, which are now referred to as Sustainable Development Goals (United Nations, 2016b)

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**Figure 1. PRISMA Flow Diagram**

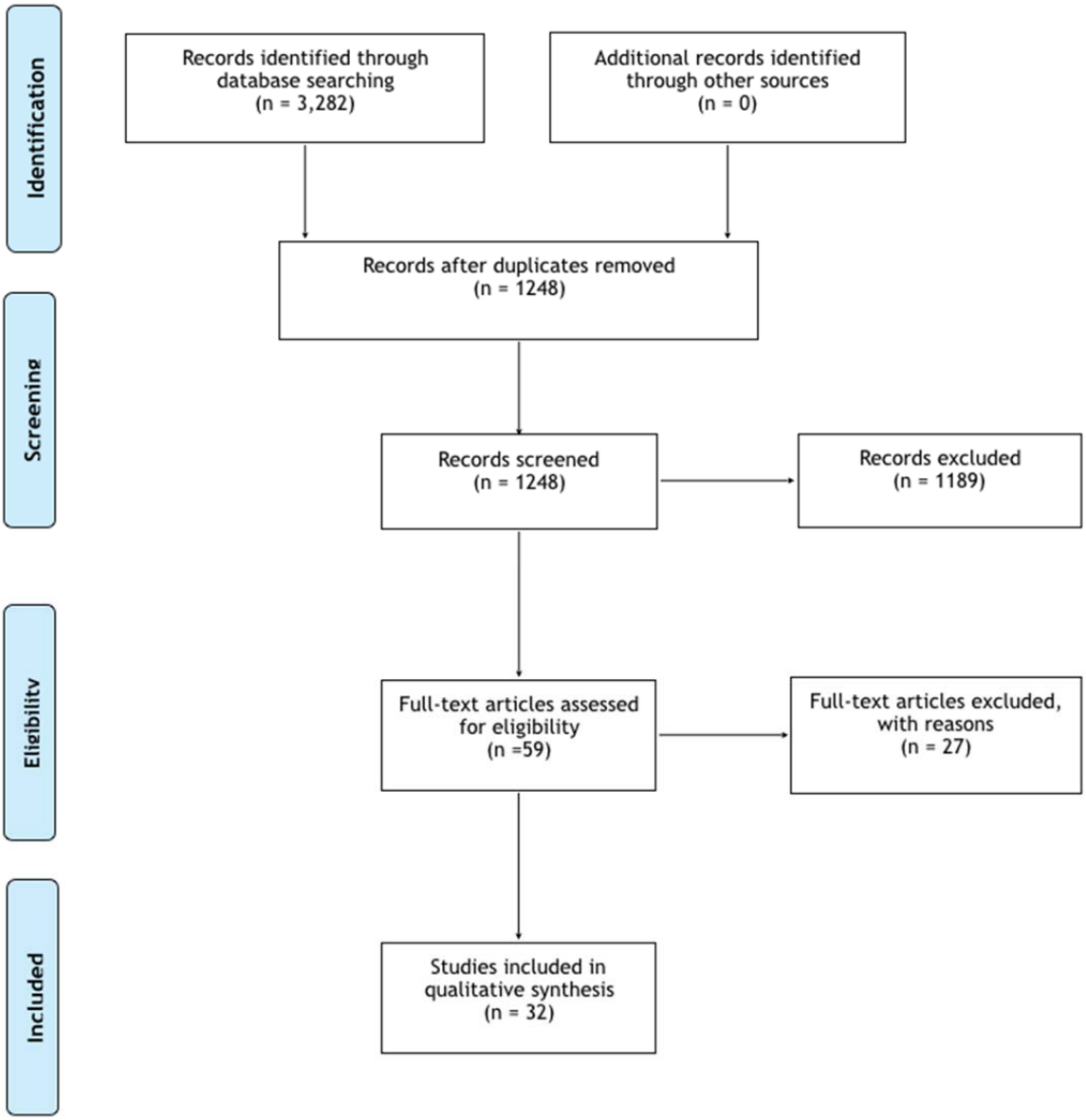

**Figure 2. Conditional Reimbursement**

**Scale of Cash Assistance for Institutional Delivery:**

**Rural Areas**

| Category | Mother's Package (In Rs.) | ASHA's Package (In Rs.) | Total Package (In Rs.) |
|---|---|---|---|
| LPS | 1400 | 600 | 2000 |
| HPS | 700 | - | 700 |

**Urban Areas**

| Category | Mother's Package (In Rs.) | ASHA's Package (In Rs.) | Total Package (In Rs.) |
|---|---|---|---|
| LPS | 1000 | 200 | 1200 |
| HPS | 600 | - | 600 |

**LPS= Low performing states**

**HPS= High performing states**

**Figure 3. Map of India**


*Source: https://www.google.com/maps/@21.1511618,79.2203956,5z; April 6, 2017*

## Table 1. Data Extraction Chart

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Amudhan et al. (2013) | 28 Villages with total population of 88,985 served by 2 PHCs and one Civil Hospital.<br>Statistical analysis of 16 time-space compartments of staggered implementation of the two intervention programs. | 1) PHC 24/7 with one additional midwife (Supply Side)<br>2) JSY Scheme (Demand side)<br><br>Maternal and neo-natal health could be improved by enhancing access to pregnancy-related health services and high-quality facility-based intrapartum care. Greater availability of obstetric services alone will not solve the problem of low institutional delivery rates. Demand side financing strategy is also required. | Institutional delivery and non-institutional delivery. | Study shows the best strategy is to create a demand and then strengthen the infrastructure to satisfy that demand.<br>institutional deliveries nearly doubled among villages with access to 24/7 delivery services;<br>odds ratio (OR) 1.9 [95% confidence interval (CI): 1.3, 2.6]. Further studies are needed to evaluate the cost effectiveness of the two strategies. | Quasi-Experimental Study |
| Biswas et al. (2002) | Programme managers and health administrators (54.7%); nursing professionals (6.8%), community medicine professionals (24.5%), other healthcare professionals (14%). | The Reproductive and Child Health Programme (RCH)(started 1997) Educational Intervention; well trained and motivated health personnel are necessary to deal with highly sensitive, personal health issues. | Participation, Location of workshops; Opinions. | Significant post workshop improvement of knowledge was evident. The mean score increased (P<0.05) to 29 +/- 8,2, 28.3 +/- 10.9 and 24.3 +/- 8.3. | Formative Evaluation |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Carvalho et al. (2014) | Data from recent District Level Household Survey (DLHS-3), one of the largest demographic and health surveys conducted in India; 34 States, December 2007 through December 2008. | JSY; Evaluates the impact of JSY on childhood immunization rates, and secondarily postnatal care, breastfeeding, care-seeking behavior. | Vaccines with and without JSY; Post-partum visits. | Analysis restricted to most recent births within the last 12 months prior to the survey, larger effects of JSY were found among vaccine outcomes that occur close to the time of birth. Receipt of financial assistance from JSY led to an increase in immunization rates ranging from 3.1 (95%CI 2.2–4.0) percentage points for one dose of polio vaccine to 9.1 (95%CI 7.5–10.7) percentage points in the proportion of fully vaccinated children. Important differences observed in the effect of JSY across children closer to birth versus children near one year of age. | Survey Study |
| Chatterjee et al. (2011) | Children and mothers of India. | Covers all National Programs executed in India; Review of existing survey data can show predictors of future trends. | Maternity Mortality Ratios, Access to Reproductive Health, Child Mortality, Antenatal, Natal, Postnatal care indicators. | Increased spending by Government of India on the health sector has had encouraging results, but India may still not achieve MDG 4 and 5 by 2015. | Secondary data analysis |
| Coffey (2014) | 20 women participated in the study. 3 villages. | Semi-structured interviews-qualitative study of JYS and ASHA programs. | Receipt of JSY benefits. Perceived quality of care. | JSY does not improve maternal and infant health because service providers are focused on capturing the economic rents from JSY, and provide an extremely poor quality of care. | Qualitative Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Doke et al. (2014) | Women in Maharashtra, India who delivered in 2008-09 with and without government assistance. | JSY in Maharashtra State, India. | Eligibility based on residence, age, parity, Caste, Income, education, Employment, Maternal Health Care Received; location of delivery, Type of delivery; knowledge of benefits programs. | 4500 women of survey sample delivered; of these 45.15% eligible for cash benefits; 24% did not receive benefits; 23% unsure of government help involved. Ante Natal Care visits, immunization, receipt and consumption of Iron and Folic Acid tablets were better among beneficiaries. | Qualitative Study |
| Evans et al. (2009) | Medical Officer Trainees actively practicing in Medical Facilities. 6 were from Rajasthan and 11 were from Gujarat. | Emergency Obstetric Care (EmOC)/ (CEmOC) training program for general medical officers (MOs) - as part of NRHM. | EmOC capability as evidenced by cesarean deliveries. | After training, 6 CEmOC-trained MOs from Gujarat performed 134verified cesarean deliveries at their facilities in the 15–22 months since completion of the training. Four CEmOC-trained MOs reported91 additional cesarean deliveries (20 in government facilities, 71 in private), but these surgeries could not be verified. | Formative Evaluation |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Fathima (2015) | 300 villages and a total of 12 such taluks (sub-districts) were included in the study. | JSY and ASHA | ASHA- Activity; effectiveness Beneficiary-reported of ASHA. | ASHA's self-reported effectiveness based on questionnaire. The areas of weakest effectiveness were found to be in the area of informational support of DOTS centers and Malaria centers. Mothers receiving additional support for unusual complications such as dehydration. In the Beneficiary reported effectiveness it was found that ASHA workers do not consistently provide counseling on birth registration, education on care during bleeding and on delayed bathing. | Survey Study |
| Fotso et al. (2015) | ASHAs (n=11);<br>AWWs (n=4);<br>ANMs (n=2);<br>Wives Post-Natal (n=11);<br>Husbands Post-Natal (n=7). | Male engagement project on the utilization and community based delivery of MNCH care in a rural district of India.; Male Heath activists (MHAs) paired with Female Accredited Social Health Activists (ASHAs) to facilitate access to MNCH services. | Gender divisions, access to transportation, culture by area, adequacy of birthing facility, geographic limits. | Responses organized broadly around the facilitation of MHAs of ASHSAs' work, and male engagement activities…found gender-based divisions of work and space in three areas 1) Escorting Women to health centers, 2) Mobilizing women and children to community health programs, and 3) Raising Awareness among men on MNCH and family planning. The addition of a male counterpart improved the success. Although Husbands were in-different to healthcare discussions when in non-emergency discussions. | Quantitative/Qualitative Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Gita et al. (2012) | Retrospective analysis of all maternal deaths occurring in the Department of Obstetrics and Gynecology of Government NSCB Medical College from January 2001 to December 2009 was done. NSCB Medical College and Hospital is situated on the outskirts of Jabalpur city. | JSY | Maternal Mortality and its causes. | The analysis finds that a great deal of maternal deaths come from complications during the antenatal period. JSY puts unfair emphasis on the institutional delivery not enough on antenatal care. Also that there is too much stress on referral facilitates. | Retrospecti ve analysis |
| Gopalan et al. (2012) | The study was conducted in Orissa, a socio-economically backward state with 85% rural, 40% poor and 22% indigenous population. Maternal mortality ratio in Orissa is 540 per 100,000 live births (national average 301) and 39% of deliveries are institutional (national average 40.7%). | JSY | Total # of deliveries, JSY beneficiaries, institutional deliveries, neonatal mortality rate, maternal mortality rate. | Demand side financial incentive could enhance financial access to maternal healthcare. It did not adequately protect households from financial risks. An effective integration of JSY with similar social protection or financial risk-protection measures may protect mothers substantially from potential out-of-pocket spending. Institutional deliveries, ante-and post-natal care visits increased after the introduction of JSY with an annual net growth of 18.1%, 3.6% and 5% respectively. Financial incentive covered only 25.5% of the maternal healthcare cost in rural areas/ 14.3% in urban areas. | Qualitative Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Gupta et al. (2012) | Women using institutional delivery in Madhya Pradesh, India. Total Population 1,276,853 in 2001, 52% were males, and 28.9% were lived in slums. Information collected on deliveries and maternal deaths in the study hospital between August 2003 and August 2007. Two phases. 2003-2005 and 2005 to 2007, before and after JSY. | JSY | Maternal Death (Gravidity and Parity1) defined1 as: the death of a woman while pregnant or within 42 days of termination of pregnancy. The cause of which was: 1) direct obstetric cause, or 2) indirect obstetric cause. Other data included age, area of residence, type of antenatal care, socioeconomic status, educational status, caste, and different causes of maternal mortality and morbidity. | This study noted more maternal deaths (total 137) during the second phase of study period (after implementation of JSY) compared to 78 deaths re-ported during the 2 years prior to the implementation of JSY. The overall maternal mortality ratio (MMR) in the study population increased (from 1,985 to 2,444 per 100,000 live births).This observation is qualified by noting that MMR increased among rural women, but decreased among urban women. More than half the maternal deaths were among the illiterate women. | Secondary data analysis |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Jimenez Soto et al. (2013) | Demographics of Philippines, Indonesia India, Nepal (Table 1 various population numbers). | Various Maternal Health programs related to Millennium Development Goals (MDG). | Key Cause of Death, Impact to Ratios, Cost. | National strategies that do not take into consideration the special circumstances of disadvantaged areas risk disempowering local managers and may lead to a "business-as-usual" acceptance of unreachable goals.<br>To effectively guide health service delivery at a local level, national plans should adopt typologies that reflect the different problems and strategies to scale up key MNCH interventions. | Formative Evaluation |
| Kinfu et al.(2015) | The density of health facilities per 1000 square kilometer, proportion of facilities that received untied funding in previous financial year and proportion of facilities in a district that had highly trained practitioners (i.e., a general surgeon or obstetrician/gynecologist/lady-medical-officer). These variables represent some of the key inputs required for providing safe delivery care. | Conditional cash assistance to mothers as they attend delivery and post-delivery care. | Data on the output of interest; on input variables that directly affect the production function; on exogenous variables that affect the inefficiency distribution (but not the production function); on a variable (or set of variables) that capture(s) spatial heterogeneity in the data and finally a spatial-weighting matrix. | Found a high level of inefficiency in the Maternal Care delivery in India. Future investment should be focused on fixing these inefficiencies. Overall mean inefficiency is about 30 percent. The result also reveals the existence of both heterogeneity and spatial correlation in institutional delivery in the country. | Survey Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Kori et al. (2015) | NRHM ASHAs active in the field for more than six months; mean age 36 years, 30% with 8th grade education, 29% with 10th grade education; 89.7% ASHAs were married; 94% were Hindu. More info provided in paper. | Cross-Sectional Study, 2011 to 2012; interview questions graded, data analysis by percentage, proportion, chi-square test and P value calculations. | ASHA's Knowledge. | ASHAs scored anywhere between Good and Average with only 12.5% scoring "very good" overall. Study suggests need for continuous professional development through OJT, more ASHA block level meetings to discuss field issues; and develop rewards system for good performance. | Cross-Sectional Study |
| Kumar et al. (2015) | Married women with at least two children. | JSY | antenatal registrations, # of postnatal checkups, Institutional Deliveries. | In the post-JSY implementation phase, the Government Health Facility was preferred more by Scheduled Castes(SC), Scheduled Tribes(ST), Other Backward Classes (OBC)(SC/ST=56.87%, OBC=60.2%, and general=43.68%),educated (Illiterate=17.39%, Primary=88.14, and Middle or above=81.94%) and the lower socioeconomic classes (LowerSEC71. 83% and Upper lower and above=45.71%)for their deliveries. It appears that the socially backward groups have benefited more from JSY. In general, JSY has increased participation in all areas of Natal care. | Cross-Sectional Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Kumutha et al. (2014) | Mothers residing in Tamil Nadu. | JSY | IMR, MMR, NMR, Tamil Nadu budget, MCH Services, Deliveries in Tamil Nadu. | Tamil Nadu has already reached the targets in reducing NMR, IMR as well as MMR due to strong Governance, Access, Services, Accountability. | Secondary data analysis |
| Lim et al. (2010) | Data was taken from the DLHS-2(620107 households) and DLHS-3 (720320 households) The survey included an interview. They surveys were done in 2002-2004 and 2007-2008 respectively. | No control just survey results based on districts and households. | They assessed the effect of the JSY on the likelihood that the women were to attend at least 3 antenatal visits; give birth in a health facility; and had skilled birth attendance. | Implementation of JSY in 2007–08 was highly variable by state…The poorest and least educated women did not always receive JSY payments. JSY had a significant effect on increasing antenatal care and in-facility births. In the matching analysis, JSY payment was associated with a reduction of 3·7 (95% CI 2·2–5·2) perinatal deaths per 1000 pregnancies and 2·3 (0·9–3·7) neonatal deaths per 1000 live births. In the with-v-without comparison, the reductions were 4·1 (2·5–5·7) perinatal deaths per 1000 pregnancies and 2·4 (0·7–4·1) neonatal deaths per 1000 live births. | Survey Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Modi et al. (2015) | 45 ASHAs among 45 Villages in Gujarat (population 45,000) over seven months in 2013. | ImTeCHO has used by Accredited Social Health Activists (ASHAs) and community-based maternal, newborn and child health (MNCH) services. | Delivery of Services, Low Coverage of Care, inadequate supervision of ASHAs. | All ASHAs found the ImTeCHO and components accessible, feasible, and useful. Real-time data was innovative. The software helped standardize the level of care. There were some issues with ASHAs entering wrong data (<5%). Use improved with training. | Formative Evaluation |
| Ng et al. (2014) | Population in Madhya Pradesh (MP) 70% of 72 million people in rural settings. 37% below poverty line. MMR is between 270 and 310. State divided into 50 Administrative districts with an average population of 1-2 million each. | JSY | The association between JSY intensity, as reflected by 1) proportion of JSY-supported institutional deliveries, 2) total annual JSY expenditure, and 3) MMR. | Analysis was unable to detect an association between maternal mortality reduction and the JSY in Madhya Pradesh. The high proportion of institutional delivery under the program does not seem to have converted to lower mortality outcomes. MMR declines in the districts varied from 2% to 35% during period studied. | Secondary data analysis |
| Pardeshi et al. (2011) | 30 villages. Study included all women that delivered 1 January 2004–31 May 2009. | NRHM | Number of Institutional deliveries; deliveries assisted by health personnel. | A significant increase was observed in the proportion of institutional deliveries [60% vs 45%; $\chi 2=173.85$, $p<0.05$, odds ratio (OR) = 1.8 (95% confidence interval (CI) 1.65-1.97)] in the NRHM period compared to the pre-NRHM period. | Cross-Sectional Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Powell-Jackson et al. (2015) | Data on the study outcomes come from the household component of the District Level Health Survey (DLHS), a repeated cross-section survey designed to provide estimates on maternal and child health and service utilization at the district level in India (International Institute for Population Sciences, 2010). We use data from two rounds of the household survey. The DLHS-2, conducted over the period 2002–2004, interviewed 507,622 currently married women in 593 districts. The DLHS-3 was carried out in 2007–2008 and interviewed 643,944 currently married women in 611 districts. | JSY; Consider the effect of the JSY on a second set of outcomes that we refer to as unintended consequences of the program. | Neo-natal mortality rates before and after JSY. JSY Coverage by year. | The collective evidence in this paper, on both intended and unintended effects, points towards the need for policymakers to be cautious in the use of financial incentives. JSY Coverage, baseline: No Education 0.22, Education 0.18; Poor half 0.22, Richest Half 0.18; Urban 0.19, Rural 0.24; HFS 0.22, LFS 0.83. Future research on this topic should broaden its scope to address questions around their long-term effects, and the potential harms they may cause. | Cross-Sectional Study |
| Prasad et al. (2013) | (1) Urban-rural differences<br>(2) Interstate differences<br>(3) Intrastate differences | NHRM and SDH | MMR, IMR, # of JSY beneficiaries, # of antenatal checkups, % of nurses by state, % of immunizations, % PNC in 10 days after delivery, Institutional deliveries, ANC checkups. | From aggregated data, the paper states the opinion that SDH and NHRM have reduced urban-rural inequality. However, more interaction is needed between separate health care groups at the state and local levels. IMR fell 15.6 points rural high focus states versus 9 points in urban areas. | Secondary data analysis |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Randive et al. (2012) | We studied all the public secondary and tertiary care centers, i.e., District Hospitals (DH), Sub-district Hospitals (SDH) and Community Health Centers (CHCs) in the selected three districts. Thus 44 health facilities in the study districts- 3 DHs (250 bedded), 8 SDHs (50- 100bedded), and 33 CHCs (30 bedded) were included. | Contracting specialists with human resource shortages to reduce maternity Mortality. Funding primarily from the IPHS. | Concentration levels of obstetricians in the private sector -v- district population; availability of skilled manpower; implementation of contracting in model for private EmOC specialists, six month performance data on facility performance. | Density and geographic distribution of private specialists are important influencing factors in determining and use of contracting in for EmOC. 83% EmOC positions were vacant during the study leading to contracted substitutes. Contracting in specialists is not a permanent fix and work must still be done to strengthen infrastructure for public health in rural areas. IPHS was more effective than JSY in this effort. | Quantitative/Qualitative Study |
| Randive et al. (2014) | population in nine low performing states, i.e., Rajasthan, Madhya, Pradesh, Chhattisgarh, Bihar, Jharkhand, Uttar Pradesh, Uttarakh and, Orissa, and Assam. | JSY | Cumulative % of institutional births -v- % of births to generate a concentration index (CI). The CI was then decomposed for predictor variables such as vulnerable population and poor households, etc. | Analysis may show JSY helps but inequality still exists. 70% of inequality from poor male literacy, EmOC availability, and poverty. Cash incentive programs need additional support. | Cross-Sectional Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Sidney et al. (2012) | Ujjain District. January to May 2011. 25% of population “Scheduled Castes”; 60 Villages. | JSY | Knowledge of JSY, place of delivery, delivery type, antenatal care, role of ASHA, infant and maternal outcomes, receipt of JSY assistance, socio-demographic variables. | Majority of deliveries under JSY program (318/418; 76%) 81% of all mothers below poverty line delivered under JSY. JSY improved participation by poor women. Barriers still exist for uneducated, multifarious, or lacked knowledge of JSY likely to deliver at home. | Cross-Sectional Study |
| Singh et al. (2015) | Rural areas as the rural population depends heavily on public health facilities for maternal and child health care services. Contrasting wealthy and poor families. | Reproductive and Child Health (RCH) | 1) breastfeeding, 2) keeping the baby warm, 3) spacing methods of family planning, 4) limiting methods of family planning, 5) nutrition, 6) institutional delivery, and 7) visiting a health facility in case of pregnancy complications. | Inequalities exist in the information received between poor and wealthy participants. The Government of India must focus on training and capacity building of the public health workers in communication skills so that they can deliver appropriate and recommended advice to all clients, irrespective of their socioeconomic status. | Survey Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Singh PK et al. (2012) | Data from the National Family Health Survey. | India's Child and Motherhood safe delivery programs; NUHM. | # of Safe Deliveries (MMR) | Study reiterates the inequality that underlies the utilization of maternal healthcare services not only by the urban poor but also by poor-migrant women. The ongoing programmatic efforts under the National Urban Health Mission should start focusing on the poorest of the poor groups such as poor-migrant women. Importantly, there should be continuous evaluation to examine the progress among target groups within urban areas. | Secondary data analysis |
| Singh SK et al. (2011) | Register General of India Sample Registration System (SRS). 2005 through 2008. | NRHM | Count of mothers having institutional births since 2005 NRHM program inception and correlation to perinatal mortality rates. | Rate of increase of institutional births post NRHM initiatives appears to show a increases in institutional births (57%), but post-natal mortality rate (PNMR) remains higher than expected (only declining 2.5% in rural areas; r=0.2, 95% confidence, -02, 0.6; P=0.3)). Getting women to hospital is not enough to meet UN Millennium Development Goal 4. | Secondary data analysis |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Varghese et al. (2014) | The intervention districts where the Yashoda program was fully functional were Alwar Rajasthan and Anugul Odiaha.; Control districts with no Yashodas were Madhopu Rajasth and Bargarh in Odisha. The survey conducted in 2 states included a total sample 1,728 mothers. | NIPI to support the NRHM. Yashoda Way- main role was to support the postpartum mother. Informational support. | Indicators of the program (pg. 2) 1.) Counseling of mothers on exclusive breastfeeding, family planning, nutrition, danger signs, cleanness 2.) Facilitation of immediate pp care. 3.) Initiation of breastfeeding within five hours 4.) Weighing of the baby. 5.) Immunization of Polio and BCG. | The facilities with Yashodas were much more likely to receive counseling on immunization, postpartum care, breastfeeding etc. (55%-97%), compared to Controlled Districts (34%-66%). | Qualitative Study |
| Vikram et al. (2013) | Across sectional community based survey. Mothers of infants in the selected areas of the two districts by stratified random sampling on a population proportionate basis. | JYS Scheme; MAMTA. | The outcome variable that is beneficiary of JSY was one who had ever interacted with the ASHA and had childbirth an institutional facility. | 71% of 469 mothers interviewed had an institutional delivery, 27.3% benefited from JSY, 14.5% had cash benefits from JSY. Number related to ASHA worker interaction is not listed. ASHA responsibilities are listed in the results. | Cross-Sectional Study |

| Author(s) (Publication Year) | Description of Sample | Description of intervention (Type of Program) | Outcome variables targeted | Results | Research Design |
|---|---|---|---|---|---|
| Zavier et al. (2013) | The study was conducted in the state of Rajasthan, India. | CCT - JSY | Interaction with Healthcare professionals, Postpartum Checkup, Received post-partum contraceptive counseling. | A larger proportion of JSY beneficiaries than non-beneficiaries reported interactions with healthcare providers during the prenatal and the postpartum periods (95% vs86%, and 81% vs 37%, respectively). Beneficiaries were more likely than non-beneficiaries to report contact with ASHAs during the pre-natal period, delivery, and the postpartum period (29% vs 17%, 19%vs 1%, and 21% vs 7%, respectively). | Cross-Sectional Study |

**Table 2. Critical Review**

The following evaluation tests are from the QARI Appraisal Instrument and are associated with one through 10 in the table that follows.

1. There is congruity between the stated philosophical perspective and the research methodology.
2. There is congruity between the research methodology and the research question or objectives.
3. There is congruity between the research methodology and the methods used to collect data.
4. There is congruity between the research methodology and the representation and analysis of data.
5. There is congruity between the research methodology and the interpretation of results.
6. There is a statement locating the researcher culturally or theoretically.
7. The influence of the researcher on the research, and vice-versa, is addressed.
8. Participants, and their voices, are adequately represented.
9. The research is ethical according to current criteria or, for recent studies, there is evidence of ethical approval by an appropriate body.
10. Conclusions drawn in the research report do appear to flow from the analysis, or interpretation, of the data.

The response to each question is entered as:
Y - Meets the criteria test
N - Does not meet the criteria test
U- Unclear, it is hard to determine if the paper meets the criteria
NA - Criteria does not apply

| Author(s) (Publication Year) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Amudhan et al. (2013) | U | Y | Y | Y | Y | N | N | N | N | N |
| Biswas et al. (2002) | Y | Y | Y | Y | N | N | N | Y | N | U |
| Carvalho et al. (2014) | U | Y | Y | Y | Y | N | N | N | N | Y |
| Chatterjee et al. (2011) | U | Y | U | Y | Y | N | N | NA | Y | Y |
| Coffey (2014) | U | Y | Y | Y | Y | U | N | Y | Y | Y |
| Doke et al. (2014) | Y | Y | Y | Y | Y | N | Y | Y | Y | Y |
| Evans et al. (2009) | U | Y | Y | Y | Y | N | N | Y | N | Y |
| Fathima (2015) | U | Y | Y | Y | Y | N | N | Y | Y | Y |
| Fotso et al. (2015) | Y | Y | Y | Y | Y | N | N | Y | N | Y |
| Gita et al. (2012) | U | Y | Y | Y | Y | N | N | N | N | Y |
| Gopalan et al. (2012) | U | Y | Y | Y | Y | N | N | Y | U | Y |
| Gupta et al. (2012) | Y | Y | Y | Y | Y | N | N | Y | U | Y |

| Author(s) (Publication Year) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Jimenez Soto et al. (2013)) | U | Y | Y | Y | Y | N | N | Y | Y | Y |
| Kinfu et al.(2015) | Y | Y | Y | Y | Y | N | N | Y | N | Y |
| Kori et al. (2015) | U | Y | Y | Y | Y | N | N | Y | N | Y |
| Kumar et al. (2015) | U | U | Y | Y | Y | N | N | U | N | Y |
| Kumutha et al. (2014) | U | Y | Y | Y | Y | N | N | U | N | Y |
| Lim et al. (2010) | U | Y | Y | Y | Y | N | N | N | N | Y |
| Modi et al. (2015) | Y | Y | Y | Y | Y | N | N | Y | N | Y |
| Ng et al. (2014) | Y | Y | Y | Y | Y | N | N | NA | Y | Y |
| Pardeshi et al. (2011) | U | Y | Y | Y | Y | N | N | Y | N | Y |
| Powell-Jackson et al. (2015) | Y | Y | Y | Y | Y | N | N | Y | N | Y |
| Prasad et al. (2013) | U | Y | Y | Y | Y | N | N | U | N | Y |
| Randive et al. (2012) | U | Y | Y | Y | Y | N | NA | Y | Y | Y |
| Randive et al. (2014) | N | Y | Y | Y | Y | N | Y | Y | Y | Y |
| Sidney et al. (2012) | U | Y | Y | Y | Y | N | N | Y | Y | Y |
| Singh SK et al. (2011) | U | Y | Y | Y | Y | N | N | N | N | Y |
| Singh PK et al. (2012) | U | Y | Y | Y | Y | N | N | U | Y | Y |
| Singh et al. (2015) | U | Y | Y | Y | Y | N | N | Y | N | Y |
| Varghese et al. (2014) | U | Y | Y | Y | Y | N | N | Y | Y | Y |
| Vikram et al.(2013) | U | Y | Y | Y | Y | N | N | Y | U | Y |
| Zavier et al. (2013) | U | Y | Y | Y | Y | N | Y | Y | N | Y |